



Complex network approach to geophysical time series analysis

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We present a new way to analysing the structural properties of time series representing the dynamics of certain real-world complex systems. For this purpose, the recurrence of certain values or dynamical patterns in a time series is described by a recurrence network, which links different points in time if the evolution of the considered observable is very similar. The transformation of the underlying binary recurrence matrix to a network structure allows a new qualitative way of analysing the characteristic properties of time series. The behaviour of measures from network theory is considered for simple cases like stochastic, periodic, and chaotic time series, before the suggested concept is applied to some examples from the geosciences. Possible generalisations of the presented approach (for example, bi- and multivariate extensions or the combination other concepts of time series analysis) are outlined.